

## RESPONSE

### Support

Applicants have amended claims 1 and 16 to specify that component (B)(1) is present from 1.6 to 3.4 weight percent. Support for these amendments is found on page 13, lines 10 to 22 and page 17 lines 19-31 of the specification. The specification states that (B)(1) may be present at weight percent values of 1.2 or more, 1.6 or more and 3.4 or more, as well as other such values throughout the specification. This disclosure implicitly includes the well defined area where (B)(1) is present at more than 1.6 and up to 3.4 weight percent. Applicants have amended claims 1 and 16 to include this range for component (B)(1). This corrects an effective typo in the previous amendment and response where 3.5 was used instead of 3.4.

Applicants have also amended claims 1 and 16 to require the presence of component (B)(3), a friction modifier component comprising glycerol monooleate or a mixture of glycerol monooleate and glycerol dioleate friction modifiers. Support for this amendment is found on page 18, lines 26 to 33 of the specification. Claims 14 and 18 have also been amended to reflect this change by removing the term friction modifier from claim 14 and removing the label (3) from claim 18.

Applicants have amended claims 1 and 16 to specify that the solvent is present from 1 to 50 percent by weight of the lubricant and has a ASTM D-93 flashpoint and ASTM D-86 distillation characteristics rendering it combustible. Support for this amendment is found on page 13, lines 26 to 27 and page 14, lines 29-31 of the specification.

Applicants have amended claim 1 to specify that the fuel to the lubricant composition in the mixture is 25-100:1 and to specify that the fuel comprises a petroleum distillate fuel, an oxygenate, or a mixture thereof. Support for these amendments are found on page 17, lines 13-14 and on page 16 line 29 to page 17 line 5 of the specification.

No other elements of the claims have been changed.

### Response

The Examiner has rejected claims 1, 3, 5-10 and 12-14 under 35 U.S.C. 103(a) as unpatentable over Blythe (US 5,264,005) in view of Teacherson (US 2004/0083729) and has rejected claims 16-20 under 103(a) as unpatentable over Blythe. The Examiner

finds that the data previously presented is not commensurate in scope with the claims being sought. The Examiner listed four specific areas reasons for this finding.

- 1) The Examiner believes a fuel to lubricant ratio of 10-250:1 in claim 1 is not commensurate in scope with the data presented.
- 2) The Examiner believes the broad coverage of fuel is not commensurate in scope with the data presented.
- 3) The Examiner believes the broad coverage of the “normally liquid solvent” is not commensurate in scope with the data presented and specifically mentions there is no concentration specified by the claims.
- 4) The Examiner finds the lack of a comparative example using a Mannich additive problematic. The Examiner indicates such an example is needed in order to show that the Mannich alone is not responsible for the observed improvement in performance, especially given the fact that Mannich appear to generally outperform aminophenol additives.

Applicants have amended the claims in order to more specifically claim the present invention and also to address the Examiner's concerns. The present claims now specify the compositions of the present invention include: (A) an oil of lubricating viscosity; (B) an additive composition comprising (1) a reaction product of a fatty hydrocarbyl-substituted monocarboxylic acylating agent and a polyamine, an alkanolamine, a thiol-containing amine, or a mixture thereof wherein the reaction product comprises a heterocyclic reaction product; and (2) either (a) a hydrocarbyl-substituted aminophenol, (b) a Mannich reaction product of a hydrocarbyl-substituted phenol, an aldehyde, and an amine, or a mixture thereof; and (3) a friction modifier component comprising glycerol monooleate or a mixture of glycerol monooleate and glycerol dioleate friction modifiers.

The data presented in this response and accompanying declaration clearly shows that it is this combination of components in the additive package, specifically components (B)(1), (B)(2) and (B)(3) that provide the surprisingly improved performance in power value ratings.

The summary table below includes all of the examples before the Examiner from the specification as filed and the previous declaration.

*Table 1 – Test Results From the Specification and Previous Declaration*

Ex No <i>Claims Require</i>	%(B)(1) <i>(1.6 to 3.5 %wt)</i>	%(B)(2)	%(B)(1)+%(B)(2) <i>(5.5 to 15 %wt)</i>	%(B)(3)	Power Valve Rating <sup>3</sup>
1 (Comp)	0	0	0	0	2.1
3 (Comp) <sup>1</sup>	1.2	6.6 APhenol	7.8	0.3	3.1
4 (Inv) <sup>1</sup>	3.0	6.6 APhenol	6.6	0.3	3.8
5 (Comp) <sup>1</sup>	1.15	5.9 APhenol	8.35	0	2.8
6 (Inv) <sup>2</sup>	2.0	7.4 Mannich	7.4	0.5	4.6
7 (Comp)	6.0	0	6.0	0.3	3.4
8 (Comp) <sup>1</sup>	6.0	4.8 APhenol	10.8	0.3	4.3
9 (Inv) <sup>2</sup>	1.6	4.0 Mannich	5.6	0.5	3.8
10 (Inv) <sup>2</sup>	1.6	5.0 Mannich	6.6	0.5	4.4
11 (Inv) <sup>2</sup>	1.6	6.0 Mannich	7.6	0.5	3.5
12 (Inv) <sup>2</sup>	1.6	9.1 Mannich	10.7	0.5	5.5

1 – The “APhenol” in Example A refers to an aminophenol additive, as described in footnote e under the Table that starts on page 20 of the specification.

2 – The “Mannich” in Example A refers to a Mannich reaction product additive, as described in footnote h under the Table that starts on page 20 of the specification.

3 – A power valve rating of 3 or higher is internally considered an “acceptable” result, however higher results indicated better performance and a rating of 3.5 or higher is internally considered to be a “superior” result.

The second summary table below includes all of the examples from the presently submitted declaration.

*Table 2 – Results of New Examples A to J*

Test Results	Ex A Comp	Ex B Comp	Ex C INV	Ex D Comp	Ex E Comp	Ex F Comp	Ex G INV	Ex H INV	Ex I Comp	Ex J Comp
(B)(1) <i>(1.6-3.5 wt%)</i>	1.2	1.2	3.0	1.2			2.0	2.0	1.0	4.0
(B)(2)	11.1	11.1	11.1	11.1	9.9	9.9	9.9	8.6	8.6	8.6
(B)(1)+(B)(2) <i>(5.5-15 wt%)</i>	12.3	12.3	14.1	12.3	9.9	9.9	11.9	10.6	9.6	12.6
Completed Test Hours	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
Piston Varnish Rating <sup>2</sup>	9.0	9.1	9.4	8.75	7.3	6.9	8.9	9.2	9.0	9.2
Undercrown Rating <sup>2</sup>	6.4	6.0	6.3	1.9	4.2	1.6	5.2	6.3	4.2	5.1
Piston Scuffing Rating <sup>2</sup>	9	9	9	9	5	8	8	9	9	9
Piston Crown Rating <sup>2</sup>	8.7	8.4	8.6	8.9	8.7	9.2	8.8	8.9	8.8	8.8
Ring Stick Rating <sup>2</sup>	10	10	10	9.0	7.3	8.1	5.0	9.0	8.9	9.0
Power Valve Rating <sup>3</sup>	3.1	3.0	3.8	2.6	2.9	4.9	4.6	4.5	4.9	5.0

2 – The piston varnish, undercrown, piston scuffing, piston crown and ring stick ratings are indicate the cleanliness and/or amount of damage to the described area and/or part at the end of the test. Higher ratings indicate better results.

3 – A power valve rating of 3 or higher is internally considered an “acceptable” result, however higher results indicated better performance and a rating of 3.5 or higher is internally considered to be a “superior” result.

As the present claims require the presence of component (B)(3), the summary tables above notes the amount of (B)(3) present in each of the previously submitted examples. The examples in the specification note the presence of this friction modifier component in the footnotes that detail each example, under the table that begins on page 20 of the specification.

Taken as a whole, the examples above demonstrate that the present invention provides unexpectantly improved performance at least over the scope of the present claims. Comparative examples show that various combinations of the components that do not meet the current claims do not provide this performance, making it clear that it is the combination of components (B)(1), (B)(2) and (B)(3) that provides the provides the surprising results.

The new examples, and what they show, are detailed in the declaration submitted with this response. Included in the declaration are Comparative Examples E and F which show that the Mannich additive, when used as component (B)(2), does not provide the surprising results by itself, or even in combination with component (B)(3), rather the combination of all three components is required, as the current claims specify.

With regards to the Examiner specific concerns regarding the scope of the claims and the scope of the data:

1) With regards to the fuel to lubricant ratio of 10-250:1 in claim 1, Applicants note that the fuel to lubricant ratio is not expected to have a significant impact on the results the present invention provides and there is no reason to expect the impact of the additive package specirfied by the present invention to provide the same relative benefit at different fuel to lubricant ratios. The fuel to lubricant ratio is really just a measure of fuel dilution and would have no impact in the concentration of the additives present in the overall composition. Therefore, it is clear that the ratio would then not have any impact on the results, so long as comparisons are made at similar ratios. That being said, Applicants have amended the claims to specify a ratio of 25-100:1, and respectfully submit, for the reasons set forth above, that there is no non-commensurate in scope issue with this element of the claims.

2) With regards to the term fuel being non-commensurate in scope with the data presented, Applicants have amended the claims to specify that the fuel of the present invention is a petroleum distillate fuel, an oxygenate, or a mixture thereof. Oxygenates are often used in place of or in mixtures with petroleum distillate fuels, including in two-stroke applications, such as those of interest in the present invention. Applicants respectfully submit that in light of these amendments there is no non-commensurate in scope issue with this element of the claims.

3) With regards to the “normally liquid solvent” which the Examiner noted has only been limited by the requirement that it have a kinematic viscosity of less than 5 cSt at 100°C, Applicants have further amended the claims. The claims now specify that the solvent is present from 1 to 50 percent by weight of the lubricant and has an ASTM D-93 flashpoint and ASTM D-86 distillation characteristics rendering it combustible. Stoddard solvent, the solvent used in the examples, fits this description and is representative of such solvents. Applicants respectfully submit that in light of these amendments there is no non-commensurate in scope issue with this element of the claims.

4) With regards to the Examiner’s concern about the lack of a Mannich-containing comparative example, Applicants have submitted new data, discussed above, which includes multiple Mannich-containing comparative examples. As discussed above, the data shows that the compositions of the present invention (which specify the combination of components (B)(1), (B)(2) and (B)(3)) provide an unexpected improvement in performance not taught by the cited references. For these reasons, Applicants respectfully submit that there is no non-commensurate in scope issue and the claims should be allowed.

#### Conclusion.

For the foregoing reasons it is submitted that the present claims are novel and unobvious over the cited reference, and in condition for allowance. The foregoing remarks are believed to be a full and complete response to the outstanding office action. Therefore an early and favorable reconsideration is respectfully requested. If the Examiner believes that only minor issues remain to be resolved, a telephone call to the Undersigned is suggested.

Any required fees or any deficiency or overpayment in fees should be charged or credited to deposit account 12-2275 (The Lubrizol Corporation).

Respectfully submitted,

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